APPENDIX E

WASTEWATER & WATER SUPPLEMENTAL INFORMATION

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- MWRA Water Supply Correspondence
- Quincy Annual Water Report
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MWRA Supply and Demand Information

Water Supply and Demand

Massachusetts Water Resources Authority

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MWRA and the Division of Conservation and Recreation keep a daily watch on reservoir levels at **Quabbin** (412 billion gallon capacity) and **Wachusett** (65 billion).

While Wachusett levels are kept relatively fixed, Quabbin levels fluctuate with precipitation and watershed runoff.

Ware River stream flows are also watched daily to determine if seasonal transfers to Quabbin during high-flow periods are possible. To gauge current system status, water supply planners have identified six reservoir status conditions that allow for normal monthly fluctuation.

The Quabbin/Wachusett system is so large that it can withstand short- and medium-length droughts and dry periods without a significant impact on its operating levels.

MANAGING DEMAND

WATER SYSTEM DEMAND

In **2010**, water system demand was **204.3** million gallons per day, average (mgd/avg).

2009	194.3 mgd/avg
2008	205.6 mgd/avg
2007	219.9 mgd/avg

2011 Data and Archive

Information on water use, system yield, watershed precipitation and levels of the Quabbin Reservoir are tracked on a daily and monthly basis. Based on a detailed analysis of major factors affecting water demand, MWRA projects that system demand will remain well below 300 million gallons per day.

SAFE YIELD

MWRA's SAFE YIELD

MWRA's source reservoirs, the Quabbin and Wachusett, can be counted on to safely provide about **300 million gallons per day** of water. This amount is called the "safe yield."

WATER SUPPLY STATISTICS

The Quabbin Reservoir
larger image

MONTHLY WATER SUPPLY STATUS REPORT

WATER SYSTEM DEMAND

IN NOVEMBER 2011
overall demand on the MWRA system was 172.90*
million gallons per day

*Preliminary

Archive

QUABBIN RESERVOIR LEVELS

ON DECEMBER 1, 2011
Elevation: 529.69 feet
Volume: 409,810 million gallons
Capacity: 99.4%

Archive

WACHUSETT RESERVOIR LEVELS

ON DECEMBER 1, 2011
Elevation: 390.50 feet
Volume: 59,817 million gallons
Capacity: 91.0%

Archive

PRECIPITATION

NOVEMBER, 2011
monthly total

Quabbin watershed: 03.90 in.
Wachusett watershed: 04.30 in.

Archive

COMMUNITY WATER USE

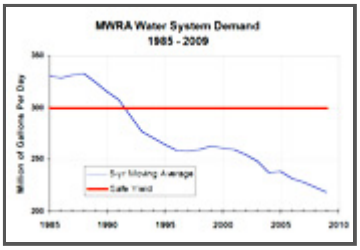
Monthly and year-to-date water use comparisons for MWRA communities

Current Report and Archive

MWRA WATER DEMAND vs. SAFE YIELD 1985-2010

For a 20-year period from 1969 to 1988, the customers of MWRA (and its predecessor MDC) routinely drew more than the safe yield.

The chart **Water System Demand 1985-2010** demonstrates this historical trend. Fortunately, precipitation was great enough throughout these years to avoid a major water supply crisis. To address this problem, MWRA launched an aggressive water conservation program in 1986. By 1989, withdrawals had been brought below the safe yield, where they have remained ever since.



larger image

This reduction in average water use was achieved through:

- Vigorous leak detection and repair efforts on MWRA and community pipes
- Retrofitting 370,000 homes with low-flow plumbing devices
- A Water Management Program for area businesses, municipal buildings and nonprofit organizations
- Extensive public information and school education programs
- A change in the state plumbing code requiring new toilets to be 1.6 gallon per flush
- Meter improvements that helped track and analyze community water use
- New water-efficient technology that has created reductions in residential use
- Water pipeline replacement and rehabilitation projects throughout the MWRA and community systems.

SOURCE RESERVOIRS

Active Source Reservoirs

MWRA's two source reservoirs, the Quabbin and Wachusett, can store 477 billion gallons of water for everyday use. Actual levels fluctuate.

WATER SYSTEM STORAGE

Source Reservoirs: 477 billion gallons

Quabbin Reservoir: 412 billion gallons

Wachusett Reservoir: 65 billion gallons

Archive of Quabbin Reservoir Levels
Archive of Wachusett Reservoir Levels

Active Supplemental Supply
MWRA stores treated water in covered tanks across its service area. Water can also be drawn from the Ware River if needed.

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Covered Storage Facilities - 262.7 million gallons

Norumbega (Weston): 115 million gallons
Nash Hill (Ludlow): 25 million gallons
Carroll (Marlborough): 45 million gallons
Blue Hills (Milton): 20 million gallons

Fells (Stoneham): 20 million gallons
Loring Road (Weston): 20 million gallons
Arlington (Arlington): 2 million gallons
Bear Hill (Stoneham): 6 million gallons
Bellevue (Boston/West Roxbury): 3.7 million gallons
Deer Island (Boston/Deer Island): 2 million gallons
Turkey Hill (Arlington):2 million gallons
Walnut Hill (Lexington): 2 million gallons)
Detailed information about MWRA Covered Drinking Water Storage

In design: Spot Pond (Stoneham): 20 million gallons

Ware River Withdrawals - amount varies

Water can be drawn from the Ware River if needed. When the Ware River flow is above 85 mgd during the period from October 15 to June 15, withdrawals are sent to the Quabbin Reservoir.

Emergency Back-up Sources and Storage

MWRA maintains a system of back-up reservoirs at points throughout its system for emergency use.

Emergency Backup Sources and Distribution Storage

Back-up Supply Sources: 7.7 billion gallons

Sudbury Reservoir (Sudbury): 7.2 billion gallons
Framingham Reservoir #3 (Framingham): 500 million gallons

Back-up Distribution Storage: 2,917 million gallons

Spot Pond (Stoneham): 1.9 million gallons
Chestnut Hill Reservoir (Boston/Newton): 500 million gallons
Norumbega Open Reservoir (Weston): 200 million gallons
Weston Reservoir (Weston): 200 million gallons
Fells Open Reservoir (Stoneham): 67 million gallons
Schenck's Pond (Weston): 50 million gallons

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Updated December 6, 2011

Massachusetts Water Resources Authority

Monthly and Year-to-Date Water Use Comparisons

Reporting Period: November 2011

ALL DATA SUBJECT TO CHANGE OR ADJUSTMENT PENDING ADDITIONAL MWRA AND COMMUNITY REVIEW

	Monthly			YTD			YTD			Prior Year-End Totals CY10	
	Flow mgd		Flow	Flow mgd		Flow	Flow Share [1]		Change in YTD Flow	Ave. Flow	Flow
Metro-System Customers	Nov-11	Nov-10	Change	CY11	CY10	Change	CY11	CY10	Share	mgd	Share [1]
Arlington	3.679	3.683	-0.1%	4.310	4.094	5.3%	2.4%	2.2%	8.4%	4.079	2.2%
Belmont	1.797	1.766	1.8%	2.059	2.282	-9.8%	1.1%	1.2%	-7.1%	2.236	1.2%
Boston (BWSC)	61.619	61.566	0.1%	65.260	66.621	-2.0%	36.3%	36.0%	0.9%	66.048	36.1%
Brookline	4.330	4.287	1.0%	5.199	5.218	-0.4%	2.9%	2.8%	2.6%	5.134	2.8%
Canton (P)	1.185	1.192	-0.5%	1.988	2.294	-13.4%	1.1%	1.2%	-10.8%	2.198	1.2%
Chelsea	3.093	2.916	6.1%	3.084	3.051	1.1%	1.72%	1.65%	4.1%	3.032	1.66%
Dedham-Westwood W.D. (P)	0.0025	0.0003	853.0%	0.028	0.051	-44.8%	0.02%	0.03%	-43.2%	0.047	0.0256%
Everett	3.679	3.699	-0.6%	3.955	4.168	-5.1%	2.2%	2.3%	-2.3%	4.125	2.3%
Framingham	6.215	5.831	6.6%	6.758	6.907	-2.2%	3.8%	3.7%	0.8%	6.805	3.7%
Leominster (P)	0.000	0.000	0.0%	0.000	0.000	0.0%	0.0%	0.0%	0.0%	0.000	0.0%
Lexington [2]	3.331	3.750	-11.2%	4.767	5.128	-7.1%	2.7%	2.8%	-4.3%	5.010	2.7%
Lynn (LWSC) (P)	0.251	0.224	12.3%	0.234	0.197	18.4%	0.1%	0.1%	22.0%	0.201	0.1%
Lynnfield W.D.	0.248	0.276	-10.1%	0.374	0.433	-13.7%	0.2%	0.2%	-11.1%	0.421	0.2%
Malden	5.367	5.278	1.7%	5.470	5.400	1.3%	3.0%	2.9%	4.3%	5.385	2.9%
Marblehead	1.296	1.293	0.3%	1.684	1.865	-9.7%	0.9%	1.0%	-7.0%	1.815	1.0%
Marlborough (P)	1.140	3.104	-63.3%	2.595	2.926	-11.3%	1.4%	1.6%	-8.7%	2.943	1.6%
Medford	4.516	4.758	-5.1%	5.049	5.048	0.0%	2.8%	2.7%	3.0%	5.023	2.7%
Melrose	1.909	1.888	1.1%	2.199	2.293	-4.1%	1.2%	1.2%	-1.2%	2.260	1.2%
Milton	2.213	1.915	15.5%	2.469	2.381	3.7%	1.4%	1.3%	6.8%	2.362	1.3%
Nahant	0.219	0.252	-12.9%	0.285	0.330	-13.6%	0.2%	0.2%	-11.0%	0.321	0.2%
Needham (P)	0.368	0.090	306.8%	0.922	0.586	57.3%	0.5%	0.3%	62.1%	0.605	0.3%
Newton	7.777	7.455	4.3%	8.855	9.000	-1.6%	4.9%	4.9%	1.3%	8.873	4.9%
Northborough (P)	0.851	0.662	28.6%	0.794	0.751	5.7%	0.4%	0.4%	8.9%	0.742	0.4%
Norwood	2.552	2.929	-12.9%	3.096	3.186	-2.8%	1.7%	1.7%	0.1%	3.156	1.7%
Peabody (P)	0.068	0.159	-57.5%	0.597	0.689	-13.3%	0.3%	0.4%	-10.7%	0.661	0.4%
Quincy	8.495	8.440	0.7%	8.984	9.282	-3.2%	5.0%	5.0%	-0.3%	9.232	5.1%
Reading	1.569	1.460	7.4%	1.658	1.787	-7.2%	0.9%	1.0%	-4.4%	1.758	1.0%
Revere	3.741	3.624	3.2%	3.969	4.179	-5.0%	2.2%	2.3%	-2.2%	4.127	2.3%
Saugus	2.531	2.354	7.6%	2.896	2.920	-0.8%	1.6%	1.6%	2.1%	2.873	1.6%
Somerville	5.375	5.690	-5.5%	5.649	5.871	-3.8%	3.1%	3.2%	-0.9%	5.818	3.2%
Southborough	0.620	0.649	-4.4%	0.861	1.056	-18.5%	0.5%	0.6%	-16.0%	1.022	0.6%
Stoneham	2.443	2.395	2.0%	2.843	2.895	-1.8%	1.6%	1.6%	1.1%	2.855	1.6%
Stoughton (P)	0.617	0.650	-5.1%	0.636	0.621	2.5%	0.4%	0.3%	5.6%	0.623	0.3%
Swampscott	1.331	1.224	8.7%	1.518	1.487	2.1%	0.8%	0.8%	5.2%	1.463	0.8%
Wakefield (P)	1.119	1.155	-3.1%	1.486	1.479	0.4%	0.8%	0.8%	3.5%	1.466	0.8%
Waltham	5.960	6.229	-4.3%	7.153	7.798	-8.3%	4.0%	4.2%	-5.5%	7.637	4.2%
Watertown	2.365	2.376	-0.4%	2.672	2.665	0.3%	1.5%	1.4%	3.3%	2.638	1.4%
Wellesley (P)	0.143	1.133	-87.4%	0.835	1.071	-22.0%	0.5%	0.6%	-19.7%	1.035	0.6%
Weston	0.941	0.895	5.2%	1.583	1.822	-13.1%	0.9%	1.0%	-10.5%	1.738	1.0%
Wilmington (P)	0.032	0.173	-81.4%	0.274	0.509	-46.3%	0.2%	0.3%	-44.6%	0.486	0.3%
Winchester (P)	0.553	0.478	15.6%	0.923	1.062	-13.0%	0.5%	0.6%	-10.4%	1.007	0.6%
Winthrop	1.181	1.198	-1.4%	1.262	1.236	2.1%	0.7%	0.7%	5.2%	1.230	0.7%
Woburn (P)	1.113	1.167	-4.6%	2.412	2.392	0.8%	1.3%	1.3%	3.9%	2.277	1.2%
Subtotal Metro-System	**157.835**	**160.261**	**-1.5%**	**179.647**	**185.031**	**-2.9%**	**100%**	**100%**		**182.768**	**100%**
Chicopee Valley Aqueduct											
Chicopee	4.954	4.565	8.5%	5.401	5.896	-8.4%	70.5%	70.1%	0.7%	5.771	70.1%
South Hadley FD #1	0.988	0.977	1.1%	1.167	1.276	-8.5%	15.2%	15.2%	0.5%	1.250	15.2%
Wilbraham	0.812	0.836	-2.8%	1.088	1.244	-12.6%	14.2%	14.8%	-3.9%	1.210	14.7%
Subtotal CVA System	**6.754**	**6.379**	**5.9%**	**7.656**	**8.416**	**-9.0%**	**100%**	**100%**		**8.231**	**100%**
Other Revenue Supply											
Cambridge (P)	0.000	0.000	0.0%	0.000	0.000	0.0%				0.000	
Clinton [3]	1.733	1.598	8.4%	1.964	1.894	3.7%				1.879	
Worcester (P)	0.000	0.000	0.0%	0.000	0.000	0.0%				0.000	
Other Revenue Customers [4]	1.527	1.462	4.4%	1.557	1.586	-1.8%				1.580	
Subtotal Other Revenue Supply [5]	**3.260**	**3.060**	**6.5%**	**3.521**	**3.481**	**1.2%**				**3.458**	
Total Water Supplied											
Fully Supplied Metro Communities	**150.392**	**150.074**	**0.2%**	**165.922**	**170.402**	**-2.6%**				**168.477**	
Communities	**6.754**	**6.379**	**5.9%**	**7.656**	**8.416**	**-9.0%**				**8.231**	
Partially Supplied Communities	**7.443**	**10.187**	**-26.9%**	**13.725**	**14.629**	**-6.2%**				**14.290**	
Other Revenue Customers	**3.260**	**3.060**	**6.5%**	**3.521**	**3.481**	**1.2%**				**3.458**	
Total Water Supplied [6]	**167.849**	**169.700**	**-1.1%**	**190.824**	**196.928**	**-3.1%**				**194.457**	

1) Flow share for each rate revenue community is the community's share of total flow for all rate revenue communities. Flow share for each Chicopee Aqueduct Valley (CVA) community is each CVA community's share of total CVA flow. Water assessments for revenue communities are calculated by allocating the total annual water rate revenue requirement based on each community's share of flow. Water assessments for CVA communities are calculated by allocating the annual CVA rate revenue requirement based on each CVA community's share of CVA flow.

2) Lexington supplies Bedford with partial MWRA water service.

3) The Town of Clinton receives up to 800 million gallons of water per year free of charge and is charged a flat wholesale rate per million gallons for water in excess of 800 million gallons per year.

4) Other Revenue Customers: Fernald School (State), D.C.R. (Parks & Pools), Stone Zoo, Deer Island WWTP and Westborough State Hospital.

5) Other Revenue Customers are charged a flat wholesale rate per million gallons of water supplied.

6) This report includes only water supplied for which revenue is collected in accordance with exisitng user agreements. It does not include water utilized for system maintenance.

(P) Community is partially supplied by MWRA.

Question's regarding water supplied can be directed to David Liston @ (617) 305-5853 or Leo Norton @ (617) 788-2256.

20-Dec-11

Hydrant Flow Test Data

Flow Test Information Sheet

VHB project number: 10577.00

VHB project name: Quincy Center Study

Location of test: Revere Road @ City parking lot
(Fire hydrant number if any)

Date & time of test: Date: 7/9/08 Time: 10:00 AM (am) (pm)

Temperature: 85° (F)

Test conducted by: T. Dowdy / VHB

Test witnessed by: P. Moody / Quincy DPW

Name of Water District:

Name of Fire District:

Source of Water Supply: Gravity ☐ Pump ☐ Other

Is water supply provided by: PRV STA's ☐ YES ☐ NO ☐

Area Map: (Draw Sketch showing property location: bounding streets and names, north arrow, hydrant location and indentification numbers, distances from hydrants to property, elevations of hydrants and building floors & grade, all water mains and sizes interconnection valves, etc.)

SEE NOTES ATTACHED

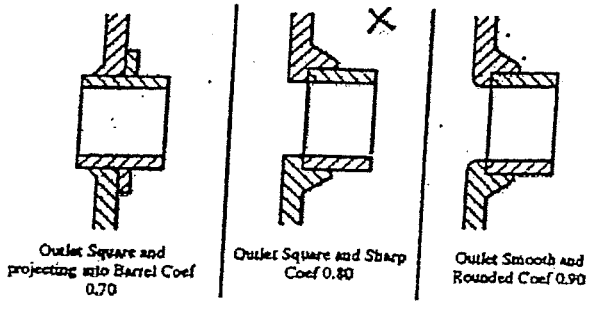
Flow Test Data:

Flow at Hydr. No.	Elevation at Hydr.	Static at Hydr. No.	Static PSIG	Residual PSIG	Flow PSIG	Outlet size and coefficient		GPM
2		1	88	79	70	2 1/2	0.8	1248
2		3	90	81	70	2 1/2	0.8	1230

Miscellaneous comments:

Signed:

Witness:



Flow Test Information Sheet

VHB project number: 10577.00

VHB project name: Quincy Center Study

Location of test: Parking Way (Ross Rd.)
(Fire hydrant number if any)

Date & time of test: Date: 7/9/08 Time: 10:45 (am) (pm)

Temperature: 85° (F)

Test conducted by: T. Dowdy / VHB

Test witnessed by: P. Moody / Quincy DPW

Name of Water District:

Name of Fire District:

Source of Water Supply: Gravity ☐ Pump ☐ Other

Is water supply provided by: PRV STA's ☐ YES ☐ NO ☐

Area Map: (Draw Sketch showing property location; bounding streets and names, north arrow, hydrant location and indentification numbers, distances from hydrants to property, elevations of hydrants and building floors & grade, all water mains and sizes interconnection valves, etc.)

SEE NOTES ATTACHED

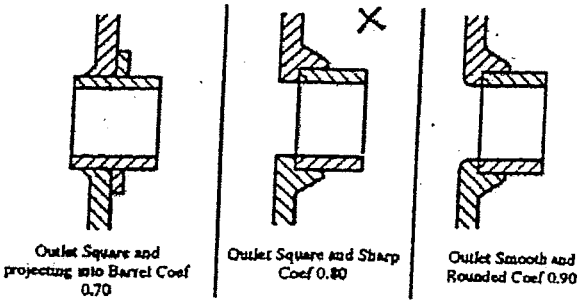
Flow Test Data:

Flow at Hydr. No.	Elevation at Hydr.	Static at Hydr. No.	Static PSIG	Residual PSIG	Flow PSIG	Outlet size and coefficient		GPM
2		1	92	81	68	2 1/2	.9	1230

Miscellaneous comments:

Signed:

Witness:

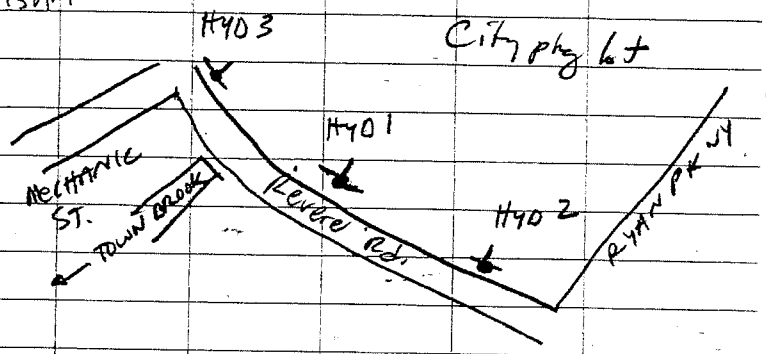


T. DOWDY — Quincy CTR — 7/9/08

S. TAYLOR

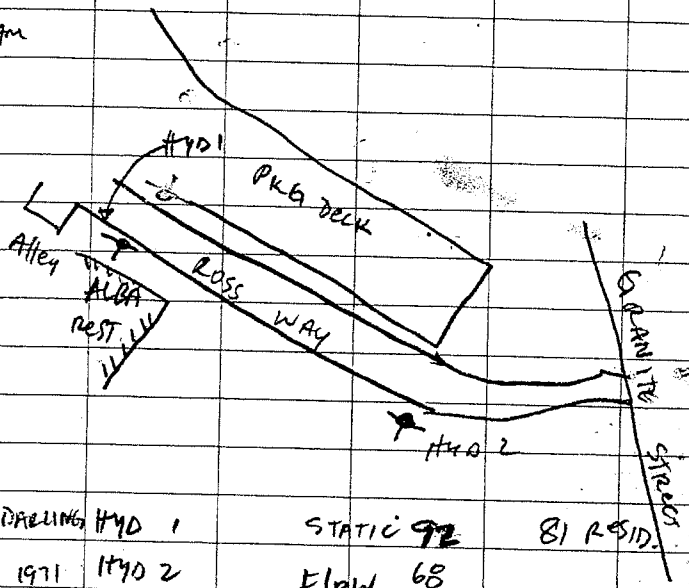
PAUL MOODY 617-376-1965

10:15AM



American Darling 5¼ 2½" opening	HYD 1	STATIC 88	79 RESID
	HYD 2	FLOW 70	
	HYD 3	STATIC 90	81 RESID

10:45AM



5¼ AM. DARLING MUELLER 1971 5¼ 2½" rounded	HYD 1	STATIC 92	81 RESID.
	HYD 2	FLOW 68	

VHB *Computations*

Project: Quincy Center Project # 10577
Location: Quincy, MA Sheet 2 of 2
Calculated by: TD Date: 7/9/08
Checked by: Date:
Title Hydrant Flow Calcs

Hyd 1 92 STATIC 81 RESIDUAL
Hyd 2 68 Flow

2½" open C=0.8

Flow = 0.8(1537) = 1230 GPM

Conversion to Base of 20 PSI

$$Q_R = Q_t \left(\frac{h_R^{0.54}}{h_f^{0.54}} \right)$$

$$= 1230 \left(\frac{(92-20)^{0.54}}{(92-81)^{0.54}} \right)$$

= 3392 GPM @ 20 PSI

VHB *Computations*

Project: Quincy Center Project # 10577
Location: Quincy MA Sheet 1 of 2
Calculated by: TD Date: 7/9/08
Checked by: Date:
Title Hydrant Flow Calcs

HYD 1 88 STATIC / 79 RESID
HYD 2 70 FLOW
HYD 3 90 STATIC / 81 RESID

2 1/2" opening C = 0.8

Flow = 0.8 (1560 GPM) = 1248 GPM

CONVERSION to Base @ 20 PSI

$$Q_R = Q_F \left(\frac{h_R^{0.54}}{h_f^{0.54}} \right)$$

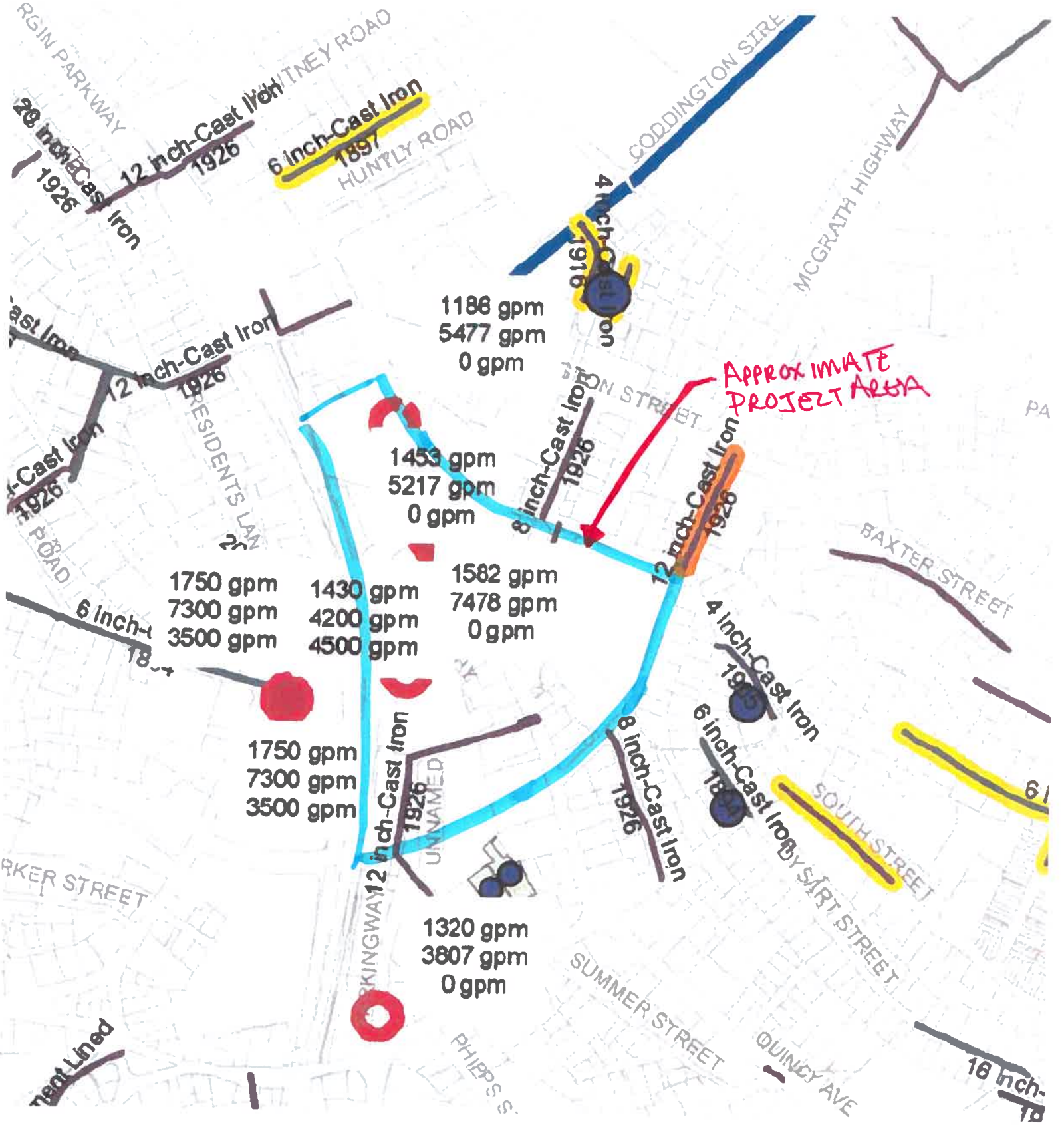
$$= 1248 \left(\frac{(88-20)^{0.54}}{(88-79)^{0.54}} \right)$$

$$= 3719 \text{ GPM @ 20 PSI}$$

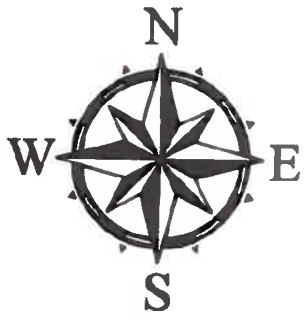
THEORETICAL DISCHARGE THROUGH CIRCULAR ORIFICES

Velocity Head (psi)	Feet	2	2.25	2.5	2.75	3	4	5	6
		Diameter of orifice in inches							
1	2.31	119	151	186	226	268	477	746	1074
2	4.61	169	214	264	319	380	675	1055	1519
3	6.92	207	262	323	391	465	827	1292	1860
4	9.23	239	302	373	451	537	955	1492	2148
5	11.54	267	338	417	504	600	1067	1668	2401
6	13.84	292	370	457	553	658	1169	1827	2630
7	16.15	316	400	493	597	710	1263	1973	2841
8	18.46	337	427	527	638	759	1350	2109	3037
9	20.76	358	453	559	677	805	1432	2237	3222
10	23.07	377	478	590	713	849	1509	2358	3396
11	25.38	396	501	618	748	890	1583	2473	3562
12	27.68	413	523	646	781	930	1653	2583	3720
13	29.99	430	544	672	813	968	1721	2689	3872
14	32.30	446	565	698	844	1005	1786	2790	4018
15	34.61	462	585	722	874	1040	1848	2888	4159
16	36.91	477	604	746	902	1074	1909	2983	4296
17	39.22	492	623	769	930	1107	1968	3075	4428
18	41.53	506	641	791	957	1139	2025	3164	4556
19	43.83	520	658	813	983	1170	2080	3251	4681
20	46.14	534	675	834	1009	1201	2134	3335	4803
22	50.75	560	708	874	1058	1259	2239	3498	5037
24	55.37	585	740	913	1105	1315	2338	3653	5261
26	59.98	608	770	951	1150	1369	2434	3803	5476
28	64.60	631	799	987	1194	1421	2526	3946	5682
30	69.21	654	827	1021	1236	1470	2614	4085	5882
32	73.82	675	854	1055	1276	1519	2700	4219	6075
34	78.44	696	881	1087	1315	1565	2783	4348	6262
36	83.05	716	906	1119	1354	1611	2864	4475	6443
38	87.67	736	931	1149	1391	1655	2942	4597	6620.
40	92.28	755	955	1179	1427	1698	3019	4717	6792
42	96.89	773	979	1208	1462	1740	3093	4833	6960
44	101.51	791	1002	1237	1496	1781	3166	4947	7123
46	106.12	809	1024	1264	1530	1821	3237	5058	7283
48	110.74	827	1046	1292	1563	1860	3307	5167	7440
50	115.35	844	1068	1318	1595	1898	3375	5273	7593
52	119.96	860	1089	1344	1627	1936	3442	5378	7744
54	124.58	877	1110	1370	1658	1973	3507	5480	7891
56	129.19	893	1130	1395	1688	2009	3572	5581	8036
58	133.81	909	1150	1420	1718	2045	3635	5679	8178
60	138.42	924	1170	1444	1747	2080	3697	5777	8318
62	143.03	940	1189	1468	1776	2114	3758	5872	8456
64	147.65	955	1208	1492	1805	2148	3818	5966	8591
66	152.26	969	1227	1515	1833	2181	3877	6059	8724
68	156.88	984	1245	1537	1860	2214	3936	6150	8855
70	161.49	998	1263	1560	1887	2246	3993	6239	8985
72	166.10	1012	1281	1582	1914	2278	4050	6328	9112
74	170.72	1026	1299	1604	1941	2309	4106	6415	9238
76	175.33	1040	1317	1625	1967	2340	4161	6501	9362
78	179.95	1054	1334	1647	1992	2371	4215	6586	9484
80	184.56	1067	1351	1668	2018	2401	4269	6670	9605
82	189.17	1080	1367	1688	2043	2431	4322	6753	9724
84	193.79	1094	1384	1709	2068	2461	4374	6835	9842
86	198.40	1107	1400	1729	2092	2490	4426	6916	9959
88	203.02	1119	1417	1749	2116	2518	4477	6996	10074
90	207.63	1132	1433	1769	2140	2547	4528	7075	10188
92	212.24	1144	1448	1788	2164	2575	4578	7153	10300
94	216.86	1157	1464	1808	2187	2603	4627	7230	10412
96	221.47	1169	1480	1827	2210	2630	4676	7307	10522
98	226.09	1181	1495	1846	2233	2658	4725	7383	10631
100	230.70	1193	1510	1864	2256	2685	4773	7458	10739
105	242.24	1223	1547	1910	2312	2751	4891	7642	11004
110	253.77	1251	1584	1955	2366	2816	5006	7821	11263
115	265.31	1280	1619	1999	2419	2879	5118	7997	11516
120	276.84	1307	1654	2042	2471	2941	5228	8169	11764
125	288.38	1334	1688	2084	2522	3002	5336	8338	12006
130	299.91	1360	1722	2126	2572	3061	5442	8503	12244
135	311.45	1386	1755	2166	2621	3119	5545	8665	12477

$Q = 29.83 (D^2)(P^{0.5})$



5/2009
WOODARD & CURRAN



Legend

Infrastructure

- Interconnection
- Pump Station
- Storage Tank
- MWRA Flow Meter
- MWRA WaterPipes

Deficient Water Mains

- 4-inch Installed before 1925
- 6-inch Installed before 1900
- Installed between 1925 and 1930
- Service System Boundaries

Capital Improvement Plan

- Neighborhood Replacement
- Clean & Line
- New Main
- Replacement
- Cleaned and Lined (1990s)

Leak Detection Data

- 0 - 1 gpm
- 2 - 3 gpm
- 4 - 10 gpm
- 11 - 30 gpm
- 31 - 50 gpm
- Fire Flow Data

Line 1: Observed Flow
Line 2: Calculated Flow @ 20 psi
Line 3: ISO Required Flow

(0 gpm represents no data available)

5/2009
Woodard & Curran

WOODARD &CURRAN

Figure 3-1
Hydrant Flow Tests, Water Main Leaks & Breaks
Quincy, Massachusetts

SCALE: 1 inch = 850 feet	**DRAWN BY: JCT**
Date: May 2009	**JOB NO : 210925.00**

5/2009
Woodard & Curran

MWRA Water Supply Correspondence

Eric Gerade

From: Bina, Lisa <Lisa.Bina@mwra.state.ma.us>
Sent: Monday, March 26, 2012 3:41 PM
To: Eric Gerade
Subject: RE: New Quincy Center Redevelopment Project - Water Supply - MWRA

Eric,
Quincy is supplied by 2-48 inch pipelines originating from Shaft 7D of the Dorchester Tunnel (see attached map). There is a 20 mg storage reservoir located at the terminus of the MWRA system referred to as the Blue Hills Covered Reservoir. There are 5 Quincy meters between Shaft 7D and the reservoir supplying the Quincy distribution system. The supply to Quincy's system is fully redundant and has sufficient capacity to supply the additional demand required for the Quincy Center Redevelopment Project under both average and maximum demand conditions. The 2-48 inch pipelines supplying the Quincy system are typically closed on daily basis upstream of the meters, during that time the supply for Quincy is from the Blue Hills Covered Reservoir. The valves on the supply lines typical open and close based on time of day except if the water level in the reservoir drops below 60%; at that time the valves will automatically open. This method of operating the system has allowed for better tank turnover rates and also maintains a day's worth of storage at Blue Hills Reservoir at all times. The only impact the additional demands will have on the MWRA system will be a slight change in how long the supply lines are closed during higher demand periods. This impact is not considered negative.

If you have any questions or require additional information please do not hesitate to call me at 617-788-4304.

Sincerely,
Lisa Bina, PE
MWRA

From: Eric Gerade [mailto:egerade@sdg-eng.com]
Sent: Monday, March 19, 2012 9:44 AM
To: Bina, Lisa
Cc: Jon Stephenson
Subject: New Quincy Center Redevelopment Project - Water Supply - MWRA

Lisa,

Sorry I forgot to follow up with you on Friday. Thanks for your help with the MWRA capacity analysis. Please use a maximum daily demand of 765,000 gpd for the New Quincy Center Redevelopment Project, this assumes a 1.75 peaking factor for the proposed development which is estimated at a net new of 434,000 gpd average.

Please let me know if you need additional information,

Thank you,

Eric K. Gerade, PE, LEED AP
Stephenson Design Group, LLC
direct. 617.695.7797
cell. 978.505.1127
email. egerade@sdg-eng.com

From: Eric Gerade [mailto:egerade@sdg-eng.com]
Sent: Thursday, March 15, 2012 11:32 AM
To: 'Leonard.Cawley@mwra.state.ma.us'
Cc: Jon Stephenson
Subject: New Quincy Center Redevelopment Project - Water Supply

Mr. Cawley,

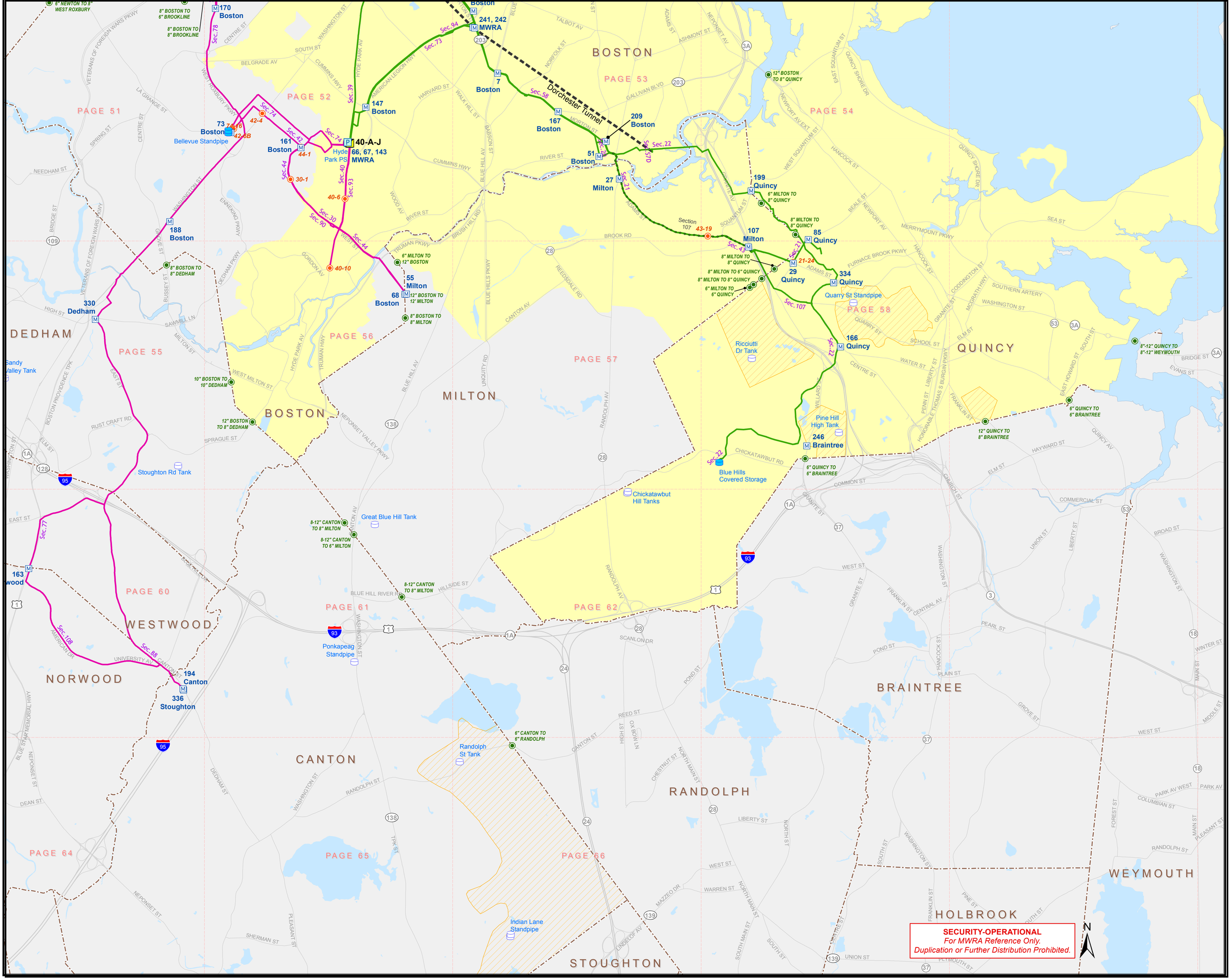
I am an engineer working on the Draft Environmental Impact Report (DEIR) for the New Quincy Center Redevelopment Project. In coordinating our responses obtained during the ENF process, I was hoping you could direct me to an appropriate person regarding water supply for the Quincy Center area. I would like to confirm capacity within the MWRA system for our increase in water demand.

As part of the development, our increase in daily water demand will be approximately 450,000 gallons per day over existing conditions. Based on the increase in demand, I would like to confirm that the current system is capable of supplying and that if any improvements are required that we can identify in the DEIR.

Thank you for your help, and feel free to contact with any questions and if you require additional information,

Regards,

Eric K. Gerade, PE, LEED AP
Associate/Senior Project Engineer
Stephenson Design Group, LLC
51 Sleeper Street
Suite 600
Boston, MA 02210
direct. 617.695.7797
cell. 978.505.1127
email. egerade@sdg-eng.com



MWRA Water Distribution System

- Division Gates
- Meters
- Emergency Connections
- Pump Stations
- Water Storage
- Aqueducts and Tunnels (Online)
- Aqueducts and Tunnels (Offline)

Pipelines by pressure zones (approx. hydraulic gradeline):

- Low Service (170'-180')
- High Service (280')
- Intermediate High (320')
- Northern Intermediate High (330')
- Southern Extra High (440')
- Northern Extra High (443')
- Future pipelines

Community System

- Comm. Interconnections
- Comm. Pump Stations
- Comm. Water Storage
- Comm. Boosted Areas

Base data

- Ponds and Reservoirs
- Shorelines
- Municipal Boundaries

Miscellaneous

- Atlas Page Boundaries
- PAGE 88 Atlas Page Numbers

Non-numbered section abbreviations

BO30 -- Boylston Street 30"
BO36 -- Boylston Street 36"
BO40 -- Boylston Street 40"
BSL -- Beacon Street Line
CH1 -- Chestnut Hill 1
CH2 -- Chestnut Hill 2
CRL -- Clinton Road Line
FI30 -- Fisher Hill 30"
FI36 -- Fisher Hill 36"
HSL -- Harvard Street Line
LWD -- Lynnfield Water District
MY24 -- Mystic Mains 24"
MY30 -- Mystic Mains 30"
SPBP -- Spot Pond Bypass
WCL -- Warren Cottage Line
WS -- Watertown Section
WSL -- Walnut Street Line

Data sources:

MWRA water distribution system data from MWRA. Emergency Connection data obtained from Maximo databases of May 22, 2009. All other data from MassGIS.

Pressure Zone Map Series

SOUTHERN HIGH SERVICE AREA (p.1 east)

Color of service area:

1 inch = 3,000 feet

0 0.5 1 Miles

Publication Date: 9/20/2011 Published by: Planning-GIS

Quincy Annual Water Report

Drink Tap Water

Your 2010 Drinking Water Test Results from the Massachusetts Water Resources Authority

be green!

This report contains very important information about your drinking water. Please translate it, or speak with someone who understands it.

Si usted desea obtener una copia de este reporte en español, llamenos al telefono 617-788-1190.

La relazione contiene importanti informazioni sulla qualità dell'acqua della Comunità. Tra-durla-o ou parlarne con un amico che lo comprenda.

O relatório contém informações importantes sobre a qualidade da água da comunidade. Tra-duza-o ou peça a alguém que o ajude a entendê-lo melhor.

Sprawozdanie zawiera ważne informacje na temat jakości wody w Twojej miejscowści. Poproś kogoś o przellumaczenie go lub porozmawiaj z osobą która je dobrze rozumie.

يحتوي هذا التقرير على معلومات هامة عن نوعية ماء الشرب في منطقتك. يرجى ترجمته، أو ابحث التقرير مع صديق لك يفهم هذه المعلومات جيدا.

Η κατοθεν ανοφορα παρουσιαζη σπουδαιες πληροφορειες για το πυσιμο νερο σας. Πρακαλω να το μεταφρασετε η να το σξολειασετε με καποιον που το καταλαβαινη απολητως.

Im Bericht steht wichtige Information über die Qualität des Wassers Ihrer Gemeinschaft. Der Bericht soll übersetzt werden, oder sprechen Sie mit einem Freund, der ihn gut aversteht.

这份报告中有些重要的信息，讲到关于您所在社区的水的品质。请您找人翻译一下，或者请能看得懂这份报告的朋友给您解释一下。

この資料には、あなたの飲料水についての大切な情報が書かれています。内容をよく理解するために、日本語に翻訳して読むか説明を受けてください。

इस रिपोर्ट में 'पीने के पानी' के विषय पर बहुत जरुरी जानकारी दी गई है। कृपया इसका अनुवाद कीजिये, या किसी जानकार से इस बारे में पुछिये।

이 보고서에는 귀하가 거주하는 지역의 수질에 관한 중요한 정보가 들어 있습니다. 이것을 번역하거나 충분히 이해하시는 친구와 상의하십시오.

Bản báo cáo có ghi những chi tiết quan trọng về phẩm chất nước trong cộng đồng quý vị. Hãy nhờ người thông dịch, hoặc hỏi một người bạn biết rõ về vấn đề này.

EPA WaterSense PARTNER

Massachusetts Water Resources Authority
and Your Local Water Department

This report is required under the Federal Safe Drinking Water Act Public Law 104-182, Section 1414(c)(4)
MWRA PWS ID# 6000000

Where To Go For Further Information

Massachusetts Water Resources Authority (MWRA)	www.mwra.com	617-242-5323
Massachusetts Dept. of Environmental Protection	www.mass.gov/dep	617-292-5500
Department of Conservation and Recreation	www.mass.gov/dcr/watersupply.htm	617-626-1250
Massachusetts Dept. of Public Health (DPH)	www.mass.gov/dph	617-624-6000
US Centers for Disease Control & Prevention (CDC)	www.cdc.gov	800-232-4636
List of State Certified Water Quality Testing Labs	www.mwra.com/04water/html/testinglabs.html	617-242-5323
Source Water Assessment and Protection Reports	www.mwra.com/sourcewater.htm	617-242-5323
Information on Water Conservation	www.mwra.com/conservation.html	617-242-SAVE

Public Meetings

MWRA Board of Directors	www.mwra.com/02org/html/boardofdirectors.htm	617-788-1117
MWRA Advisory Board	www.mwraadvisoryboard.com	617-788-2050
Water Supply Citizens Advisory Committee	www.mwra.com/02org/html/wscac.htm	413-213-0454

For a large print version of this report, call 617-242-5323.

Where Does Your Water Come From?

Dear Customer,

This report contains the 2010 test results on your drinking water. Hundreds of thousands of tests confirmed that the quality of your water is excellent. For 2010, MWRA met every federal and state drinking water standard. System-wide, we have been below the Lead Action Level for the past seven years. Please see your community's letter for more information on your local system.

Two upcoming projects will enhance the quality and safe delivery of our water. Soon, we will begin building ultraviolet disinfection facilities at our Carroll Water Treatment Plant. Together with ozone, this will give us two forms of powerful disinfection. Then, we will be constructing a water tank and pumping station in Stoneham to provide storage for six communities, and redundancy for 21 communities in case of an emergency.

You may have heard press reports about a chemical called Hexavalent Chromium, or Chromium 6. Although there are no federal standards for this substance, MWRA has begun voluntary testing for it as recommended by the EPA. In response to the Japanese earthquake, we have also tested for and found no traces of radioactive iodine or cesium. As more information becomes available, we will share it with you at www.mwra.com.

Please take a moment to read the important information in this report. We want you to share our confidence in your drinking water.

Sincerely,

Frederick A. Laskey
Executive Director

Your Water Comes From the Quabbin Reservoir, about 65 miles west of Boston, and the Wachusett Reservoir, about 35 miles west of Boston. These reservoirs supply wholesale water to local water departments in 51 communities. The two reservoirs combined supplied about 200 million gallons a day of high quality water to consumers in 2010.

The Quabbin and Wachusett watersheds are protected naturally with over 85% of the watersheds covered in forest and wetlands. To ensure safety, the streams and reservoirs are tested often and patrolled daily by the Department of Conservation and Recreation (DCR).

Rain and snow falling on watersheds – protected land around the reservoirs – turn into streams that flow to the reservoirs. This water comes in contact with soil, rock, plants, and other material as it follows its natural path to the reservoirs.

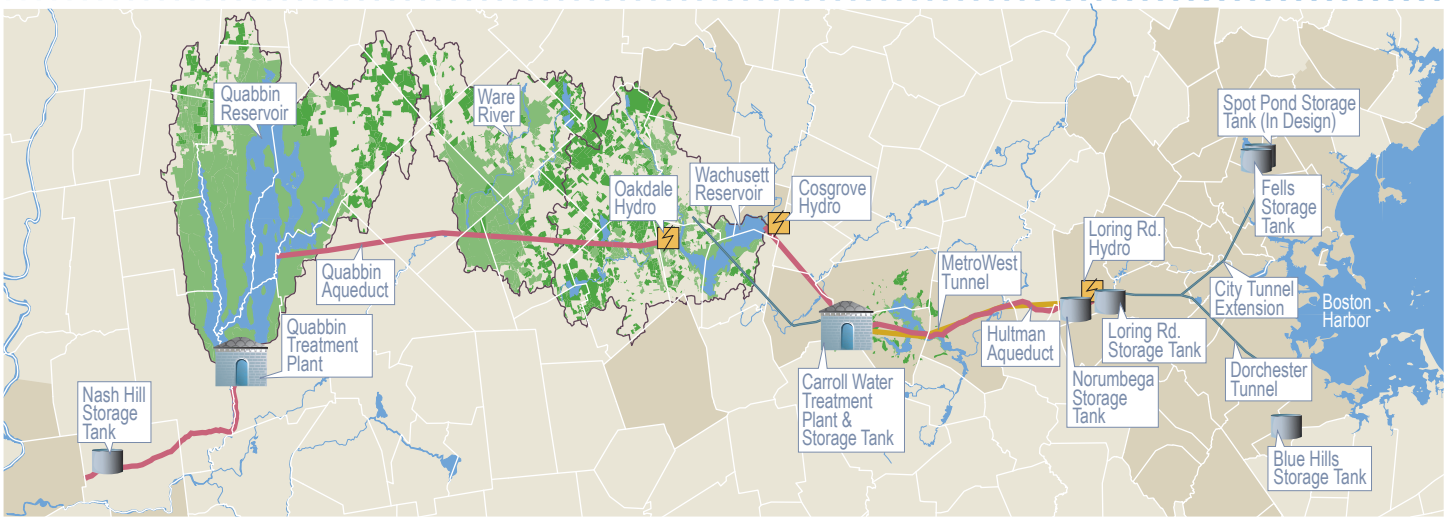
While this process helps to clean the water, it can also dissolve and carry very small amounts of material into the reservoir. Minerals from soil and rock do not typically cause problems in the water. But, water can also transport contaminants from human and animal activity. These can include bacteria, viruses, and fertilizers – some of which can cause illness. The test data in this report show that these contaminants are not a problem in your reservoirs' watersheds.

The Department of Environmental Protection (DEP) has prepared a Source Water Assessment Program report for the Quabbin and Wachusett Reservoirs. The DEP report commends DCR and MWRA on the existing source protection plans, and states that our "watershed protection programs are very successful and greatly reduce the actual risk of contamination." The report recommends that we maintain present watershed plans and continue to work with residents, farmers, and other interested parties to maintain the pristine watershed areas.

PHOTO BY ALAN JUNG - THE METROWEST DAILY NEWS

The Green Choice

As water travels eastward directly to your faucet, clean hydro-energy is produced. MWRA also has wind turbines and solar panels at our Deer Island Plant and solar panels at our Carroll Treatment Plant. Tap water is delivered straight to your home without trucking or plastic waste. Drink tap water and be green!



From the Reservoir to Your Home

Water Treatment The water you drink is treated at the John J. Carroll Water Treatment Plant in Marlborough. The first treatment step is disinfection of reservoir water. MWRA's licensed treatment operators carefully add measured doses of ozone gas bubbles, produced from pure oxygen gas, to the water to kill any pathogens (germs) that may be present in the water. Fluoride is then added to reduce cavities. Next, the water chemistry is adjusted to reduce corrosion of lead and copper from home plumbing. Last, we add mono-chloramine, a mild and long-lasting disinfectant combining chlorine and ammonia, which protects the water while it is in the local pipelines.

MWRA's Improvements To The Water Supply 2010 marked the 25th anniversary of the MWRA. In that time, MWRA and our community partners have made improvements to the entire water system: from the watersheds, to the aqueducts and tunnels, to treatment plants, and to MWRA and local pipelines. These are the largest investments in the water system since the 1930s. MWRA and our community partners continue to make the necessary investments to maintain and upgrade our facilities. Take a look at our 25th anniversary report at www.mwra.com.

Testing Your Water – Every Step Of The Way Test results show few contaminants are found in the reservoir water. The few that are found are in very small amounts, well below EPA's standards. Turbidity (or cloudiness of the water) is one measure of overall water quality. There are two standards for turbidity: all water must be below 5 NTU (Nephelometric Turbidity Units), and can only be above 1 NTU if it does not interfere with effective disinfection. MWRA met both of these standards. Typical levels at the Wachusett Reservoir are 0.4 NTU and were below the 1 NTU over 99.99% of the time. The highest level was 1.69 NTU, but this did not interfere with effective disinfection. MWRA also tests reservoir water for pathogens such as fecal coliform, bacteria, viruses, and the parasites *Cryptosporidium* and *Giardia*. They can enter the water from animal or human waste. All test results were well within state and federal testing and treatment standards.

Test Results – After Treatment EPA and State regulations require many water quality tests after treatment to check the water you are drinking. MWRA conducts tens of thousands of tests per year on over 120 contaminants (for a complete list visit www.mwra.com). The only contaminants found are listed below, and all levels met EPA's standards. The bottom line is that the water quality is excellent.

Test Results - After Treatment

Compound	Units	(MCL) Highest Level Allowed	(We found) Detected Level-Average	Range of Detections	(MCLG) Ideal Goal	Violation	How it gets in the water
Barium	ppm	2	0.009	0.009-0.01	2	No	Common mineral in nature
Mono-chloramine	ppm	4-MRDL	1.8	0-3.6	4-MRDLG	No	Water disinfectant
Fluoride	ppm	4	1.05	0.75-1.15	4	No	Additive for dental health
Nitrate^	ppm	10	0.14	0.03-0.14	10	No	Atmospheric deposition
Nitrite^	ppm	1	0.01	0.01	1	No	Byproduct of water disinfection
Perchlorate	ppb	2	0.06	0.05-0.07	ns	No	Byproduct of water disinfection
Total Trihalomethanes	ppb	80	14	1.9-20.4	ns	No	Byproduct of water disinfection
Haloacetic Acids-5	ppb	60	12.4	0-18	ns	No	Byproduct of water disinfection

KEY: **MCL**=Maximum Contaminant Level. The highest level of a contaminant allowed in water. MCLs are set as close to the MCLGs as feasible using the best available technology. **MCLG**=Maximum Contaminant Level Goal - The level of contaminant in drinking water below which there is no known or expected risk to health. MCLGs allow for a margin of safety. **MRDL**=Maximum Residual Disinfectant Level. The highest level of a disinfectant allowed in drinking water. There is convincing evidence that addition of a disinfectant is necessary for control of microbial contaminants. **MRDLG**=Maximum Residual Disinfectant Level Goal. The level of a drinking water disinfectant below which there is no known or expected health risk. MRDLGs do not reflect the benefits of the use of disinfectants to control microbial contamination. **ppm**=parts per million **ppb**=parts per billion **ns**=no standard **^**As required by DEP, the maximum result is reported for nitrate and nitrite, not the average.

Information About Cross Connections

Massachusetts DEP recommends the installation of backflow prevention devices for inside and outside hose connections to help protect the water in your home as well as the drinking water system in your town. For more information on cross connections, please call 617-242-5323 or visit www.mwra.com/crosscon.html.

NOTICE

Information on the May 1st Boil Water Order

On May 1st of 2010, a major pipe break caused a disruption in water service, and the activation of a back-up water supply. MWRA has several back-up supplies throughout the service area for emergencies. This back-up supply did not meet the high standards of our normal reservoir, and therefore a precautionary boil water order was needed. After repairs and many tests, normal water service was back within 72 hours. If MWRA were to have another emergency, you would be notified via radio, television, newspapers, state and local government, health officials, and by MWRA.

Tests in Community Pipes

MWRA And Local Water Departments test 300 to 500 water samples each week for total coliform bacteria. Total coliform bacteria can come from the intestines of warm-blooded animals, or can be found in soil, plants, or other places. Most of the time, they are not harmful. However, their presence could signal that harmful bacteria from fecal waste may be there as well. The EPA requires that no more than 5% of the samples in a month be positive. If a water sample does test positive, we run more specific tests for *E.coli*, which is a bacteria found in human and animal fecal waste and may cause illness.

Total Coliform Results

Community	Highest % of positive samples and month	Violation of EPA's 5% limit
Arlington	2.5% (May)	No
Belmont	4.3% (Aug)	No
Boston	0.7% (May)	No
Brookline	1.1% (Aug)	No
Chelsea	1.9% (Mar)	No
Framingham	2.6% (Nov)	No
Saugus	1.7% (May)	No
Somerville	7.0% (Nov)	Yes*
Stoneham	3.1% (Oct)	No
MWRA	0.8% (Aug)	No

How Did We Do In 2010?

The table reports test results from 30 communities that receive all of their water from MWRA. No *E.coli* was found in any MWRA community in 2010. *Residents of Somerville should read their community letter for more information.

Ongoing Research for New Regulations

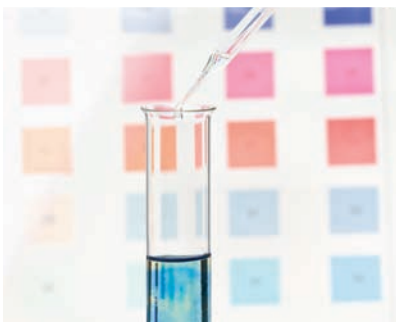
MWRA has been working with EPA and other researchers to define new national drinking water standards by testing for unregulated contaminants. To better understand the drinking water, MWRA has voluntarily been testing for *Cryptosporidium* and *Giardia* prior to treatment. No *Cryptosporidium* was detected in 2010.

Test	Measurement Units	Average
Giardia	cysts per 100L	9.1

MWRA's disinfection is designed and operated to kill *Giardia*.

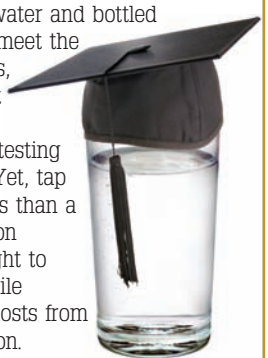
NDMA	nanograms per liter	0.54*

*The result is from 2009. The DEP guidance value for NDMA is 10 ng/L.



Tap Water- The Smart Choice!

Although tap water and bottled water have to meet the same standards, tap water must meet the more intensive EPA testing requirements. Yet, tap water costs less than a penny per gallon delivered straight to your home, while bottled water costs from $1 to $8 a gallon.



Drinking Water And People With Weakened Immune Systems Some people may be more vulnerable to contaminants in drinking water than the general population. Immuno-compromised persons such as persons with cancer undergoing chemotherapy, persons who have undergone organ transplants, people with HIV/AIDS or other immune system disorders, some elderly, and infants can be particularly at risk from infections. These people should seek advice about drinking water from their health care providers. EPA/CDC guidelines on appropriate means to lessen the risk of infection by *Cryptosporidium* and other microbial contaminants are available from the EPA's Safe Drinking Water Hotline (1-800-426-4791).

Contaminants In Bottled Water And Tap Water Drinking water, including bottled water, may reasonably be expected to contain at least small amounts of some contaminants.The presence of contaminants does not necessarily indicate that water poses a health risk. More information about contaminants and potential health effects can be obtained by calling the EPA's Safe Drinking Water Hotline (1-800-426-4791) or MWRA. In order to ensure that tap water is safe to drink, the Massachusetts DEP and EPA prescribe regulations which limit the amount of certain contaminants in water provided by public water systems. Food and Drug Administration (FDA) and Massachusetts Department of Public Health regulations establish limits for contaminants in bottled water which must provide the same protection for public health.

Facts About Sodium

Sodium in water contributes only a small fraction of a person's overall sodium intake (less than 10%). MWRA tests for sodium monthly and the highest level found was 35.3 mg/l (about 9 mg per 8 oz. glass). This would be considered very low sodium by the Food and Drug Administration.

CITY OF QUINCY, MASSACHUSETTS

THOMAS P. KOCH
MAYOR

LAWRENCE J. PREDEVILLE
COMMISSIONER

Public Water Supply
3243000

Dear Water Customer:

The consumer confidence report provides important information pertaining to the quality of water supplied by the City of Quincy in partnership with the Massachusetts Water Resource Authority (MWRA). This annual report provides detailed information on the MWRA's source water reservoirs and the quality of water as determined by the federal and state monitoring regulations. Water quality test data, as well as definitions of the terms used within the drinking water industry are presented in clear and plain language. The water quality testing information is also presented as it relates to the health effects of contaminants that are tested for. The MWRA is the only source of water distributed by the City of Quincy.

The 228 miles of distribution main in the City of Quincy provides water to 23,000 service connections. The average daily consumption within the city during 2010 was 9.2 million gallons per day. Some areas that had water mains replaced in 2010 were McGrath Hwy. from S. Artery to Washington St., Revere Rd. from Washington St. to Dennis Ryan Parkway, and the Rock Island Rd. cove area in Hough's Neck. Under the Water System Capital Improvement Plan, $1.2 million worth of extensive water main replacement was put out to bid for 2011.The city plans to continue its aggressive approach to replace various water mains throughout the system. In addition the city has contracted out $920,000 worth of work to restore our water pump stations and storage tanks. The city has also contracted out a fixed based water meter replacement program that will replace water meters in every home in the city which should provide more accuracy and efficiency in our water billing.

Results of the September 2010 Lead and Copper Testing Program indicate that the City of Quincy has once again achieved its goal of staying under the 15ppb action level for lead, with a 90th percentile of 2.30 ppb. The City of Quincy has made arrangements with a testing laboratory for any household that may have concerns with lead and copper levels. For $25.00, you can pick up a testing kit and detailed instructions in the water billing office located at 55 Sea St.

The Sewer, Water, and Drain Division 24-hour emergency telephone number is (617) 376-1910. Any resident with billing concerns can contact the billing office at (617) 376-1918 Monday through Friday between 8:30AM and 4:00PM.

Best Regards,

Peter Hoyt
Superintendent

What You Need to Know About Lead In Tap Water

MWRA Water Is Lead-Free when it leaves the reservoirs. MWRA and local pipes that carry the water to your community are made mostly of iron and steel and do not add lead to the water. However, lead can get into tap water through pipes in your home, your lead service line, lead solder used in plumbing, and some brass fixtures. Corrosion or wearing away of lead-based materials can add lead to tap water, especially if water sits for a long time in the pipes before it is used.

In 1996, MWRA began adding sodium carbonate and carbon dioxide to adjust the water's pH and buffering capacity. This change has made the water less corrosive, thereby reducing the leaching of lead into drinking water. Lead levels found in sample tests of tap water have dropped by almost 90 percent since this treatment change.

MWRA Meets Lead Standards In 2010 Under EPA rules, each year MWRA and your local water department must test tap water in a sample of homes that are likely to have high lead levels. These are usually homes with lead service lines or lead solder. The EPA rule requires that 9 out of 10, or 90%, of the sampled homes must have lead levels below the Action Level of 15 parts per billion (ppb).

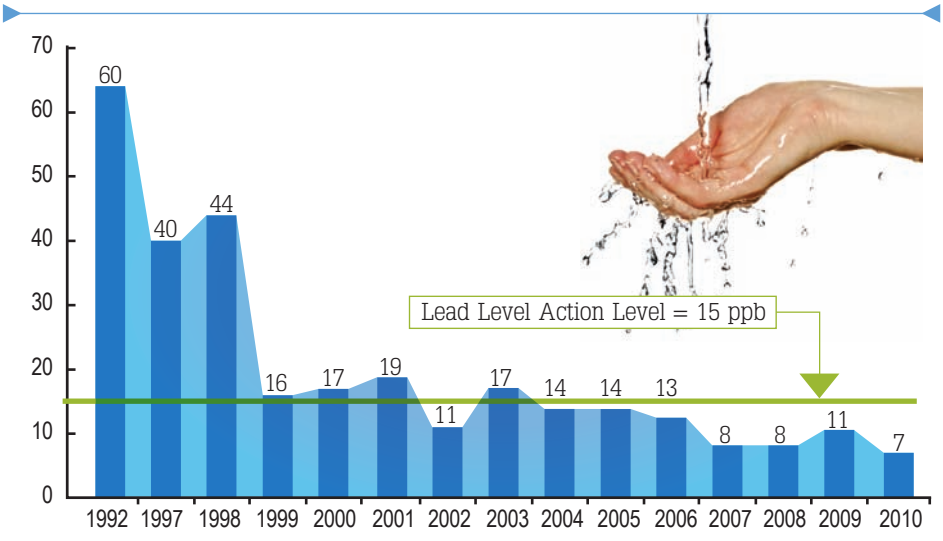
All 14 sampling rounds over the past seven years have been below the EPA standard. Results for the 450 samples taken in September 2010 are shown in the table. 9 out of 10 houses were below 7.03 ppb, which is below the Action Level of 15 ppb. Some individual communities had more than one home test above the Action Level for lead. If you live in one of these communities, your town letter will provide you with more information.

September 2010 Lead & Copper Results

	Range	90% Value	(Target) Action Level	(Ideal Goal) MCLG	# Homes Above AL/ # Homes Tested
Lead	0.07-57.5	7	15	0	10/450
Copper	0.003-0.3	0.1	1.3	0	0/450

KEY: AL= Action Level - The concentration of a contaminant which, if exceeded, triggers treatment or other requirements which a water system must follow. Definition of **MCLG** available on page 4.

90% Lead Levels in MWRA Fully Served Communities
1992 - 2010



Important Lead Information from EPA

If present, elevated levels of lead can cause serious health problems, especially for pregnant women and young children. Lead in drinking water is primarily from materials and components associated with service lines and home plumbing. MWRA is responsible for providing high quality drinking water, but cannot control the variety of materials used in plumbing components. If your water has been sitting for several hours, you can minimize the potential for lead exposure by flushing your tap for 30 seconds to 2 minutes before using water for drinking or cooking. If you are concerned about lead in your water, you may wish to have your water tested.

Information on lead in drinking water, testing methods, and steps you can take to minimize exposure is available from the Safe Drinking Water Hotline at 1-800-426-4791 or at www.epa.gov/safewater/lead.

What Can I Do to reduce exposure to lead in drinking water?

- Run the tap until after the water feels cold. To save water, fill a pitcher with fresh water and place in the refrigerator for future use.
- Never use hot water from the faucet for drinking or cooking, especially when making baby formula or other food for infants.
- Ask your local water department if there is a lead service line leading to your home.
- Check your plumbing fixtures to see if they are lead-free. Read the labels closely.
- Test your tap water. Call the MWRA Drinking Water Hotline (617-242-5323) or visit our website for more tips and a list of DEP certified labs that can test your water.
- Be careful of places where you may find lead in or near your home. Paint, soil, dust and some pottery may contain lead.
- Call the MA Department of Public Health at 1-800-532-9571 or EPA at 1-800-424-LEAD for health information.

Estimated Irrigation Demand

SDG

STEPHENSON DESIGN GROUP

Project: QUINCY DCTR - IRRIGATION WATER DEMANDS Project #: 10006

Engineer: ERG Date: 3/20/12

ESTIMATE IRRIGATION DEMAND FOR QUINCY CENTER

"GUIDELINES FOR ESTIMATING UNMETERED LANDSCAPING WATER USE" - U.S. DEPT. ENERGY - JULY 2010

STEPS REQUIRED
1. LOCATION
2. TURF / LA TYPE
3. AREA
4. ANNUAL IRRIG. FACTOR
5. SYSTEM EFFICIENCY
6. CALC TOTAL

EQUATION

$$\text{ANNUAL LA WATER USE (gal/year)} = \frac{\text{ANNUAL IRRIG. FACTOR}\left(\frac{\text{GAL}}{\text{ft}^2\text{-yr}}\right) \times \text{IRRIG. AREA (ft}^2\text{)}}{\text{IRRIG. SYST. EFFICIENCY}}$$

PARAMETERS / ASSUMPTIONS - FROM DOCUMENT

CLIMATE ZONE: HUMID CONTINENTAL - WARM SUMMER (TABLE 1)

TURF GRASS: COOL SEASON TYPE ASSUMED (TABLE 2)

LANDSCAPE TYPE:
1. WATER REQUIREMENTS - ASSUME MODERATE
2. DENSITY: ASSUME AVERAGE
3. TYPE OF MICROCLIMATE: ASSUME OPEN

AREA

TURFGRASS: 55,000 SF
LANDSCAPE: 36,000 SF

FACTORS

ANNUAL IRRIGATION FACTOR - TURFGRASS (TABLE 3)

	COOL SEASON TURF	WARM SEASON TURF
BOSTON	4.63	0.97

ANNUAL IRRIGATION FACTOR - LA W/ MODERATE WATER REQUIREMENTS

BOSTON - W/ AVG DENSITY, OPEN MICROCLIMATE: 0.37

EFFICIENCY: ASSUME MEDIUM: 65% → NEW INSTALL SAY 70%

SDG

STEPHENSON DESIGN GROUP

Project: QUINCY DEIR IRRIGATION WATER DEMAND Project #: 10006

Engineer: EKG Date: 3/20/12

ESTIMATE OF IRRIG WATER DEMAND

$$\text{ANNUAL DEMAND} = \frac{\text{ANN IRRIG. FACTOR} \times \text{AREA}}{\text{EFFICIENCY}}$$

1. TURFGRASS

$$= \frac{4.63\left(\frac{\text{gal}}{\text{ft}^2\text{-yr}}\right) \times 55{,}000}{0.70}$$

$$= 363{,}786 \text{ gal/year}$$

2. LANDSCAPE AREA

$$= \frac{0.37\left(\frac{\text{gal}}{\text{ft}^2\text{-yr}}\right) \times 36000}{0.70}$$

$$= 19{,}029 \text{ gal/yr}$$

TOTAL = 363,786 + 19029 = **382,815 gal year**

382,815 gal/year / 365 day/year ⇒ **1,050 gpd**

ASSUME 8-MONTH WATERING DEMANDS FOR HOA

382,815 gal/yr / (8 × 31) = 1544 gpd

SAY 1,550 gpd *